CLAIMS

What is claimed is:

1. A method of adapting to a payload rate the effective rate of an MPEG Transport Stream originating with an incoming rate, said Stream having of a sequence of MPEG packets, said method comprising:

altering timing information in any said MPEG packets that bear said timing information;

if said incoming rate is less than said payload rate, then selectively inserting stuffing packets into said MPEG Transport Stream; and

if said incoming rate is greater than said payload rate, then selectively discarding certain packets from said MPEG Transport Stream.

2. A method according to claim 1 further comprising:

forwarding any non-discarded MPEG packets and stuffing packets, if any, into a FIFO, said FIFO outputting packets at said payload rate, said forwarding achieved after the altering of timing information.

3. A method according to claim 2 further comprising:

temporarily storing each MPEG packet from said MPEG Transport Stream in a one-packet buffer prior to forwarding; and

prior to altering, inserting and discarding, waiting until said one-packet buffer contains a complete one of said MPEG packets.

4. A method according to claim 3 further comprising:

setting a watermark point for said FIFO.

5. A method according to claim 4 further comprising:

determining which of said MPEG packets bears timing information.

6. A method according to claim 5 wherein said timing information includes a Program Clock Reference (PCR) value.

7. A method according to claim 6 wherein altering timing information includes:

adding an offset to said PCR value if there are more packets currently in said FIFO than said watermark the instant said one-packet buffer contains a complete MPEG packet; and

subtracting said offset to said PCR value if there are less packets currently in said FIFO than said watermark the

instant said one-packet buffer contains a complete MPEG packet.

8. A method according to claim 7 wherein said offset varies in accordance with said payload rate.

9. A method according to claim 8 wherein said payload rate is a Quadrature Amplitude Modulation (QAM) rate.

10. A method according to claim 9 wherein said offset is 1.001855 ticks per bit for a QAM rate corresponding to 64QAM modulation.

11. A method according to claim 9 wherein said offset is 0.692308 ticks per bit for a QAM rate corresponding to 256QAM modulation.

12. A method according to claim 4 wherein said selectively inserting stuffing packets into said MPEG Transport Stream is performed only if said FIFO contains less packets than said watermark the instant said one-packet buffer contains a complete MPEG packet.

13. A method according to claim 8 wherein a single stuffing packet is inserted into said FIFO prior to forwarding of said complete MPEG packet in said one-packet buffer.

14. A method according to claim 4 wherein said selectively discarding MPEG packets is performed only if said FIFO contains more packets than said watermark the instant said one-packet buffer contains a complete MPEG packet.

15. A method according to claim 14 wherein said selectively discarding includes:

determining whether the complete MPEG packet in said one-packet buffer can be discarded; and

if said complete MPEG packet can be discarded then discarding said complete MPEG packet by not forwarding it to said FIFO.

16. A method according to claim 15 wherein determining includes:

comparing the PID of said complete MPEG packet with a list of disposable PIDs, further wherein if the PID of said complete MPEG packet is on said list, then said packet can be discarded.

17. A method according to claim 16 wherein determining further includes:

if said packet is a stuffing packet, then said packet is determined to be discarded.

18. A method according to claim 1 wherein said stuffing packet is a NULL packet.

19. A system of adapting to a payload rate the effective rate of an MPEG Transport Stream originating with an incoming rate, said Stream having of a sequence of MPEG packets, said system comprising:

a timing information altering mechanism configured to alter timing information in any said packets bearing such information;

a FIFO capable outputting packets at said payload rate, said FIFO characterized by a watermark;

a one-packet buffer accepting said MPEG packets one packet at a time from said Stream;

an instantaneous transfer mechanism coupled between said one-packet buffer and said FIFO, said mechanism forwarding a packet from said one-packet buffer upon a first condition and a stuffing packet upon a second condition.

20. A system according to claim 19 wherein said incoming rate is less than said payload rate.

21. A system according to claim 20 wherein said first condition includes said FIFO having less packets than said

watermark the instant said one-packet buffer contains a complete MPEG packet.

22. A system according to claim 19 wherein said timing information includes a Program Clock Reference value.

23. A system according to claim 21 wherein said second condition includes said FIFO having more packets than said watermark the instant said one-packet buffer contains a complete MPEG packet.

24. A system according to claim 19 wherein said timing information altering mechanism includes:

a mechanism to test for packets carrying timing information, said mechanism to test coupled to said one-packet buffer;

a mechanism to determine the amount by which said timing information should be altered, said mechanism to determine coupled to said FIFO; and

a mechanism to perform arithmetic on said timing information by said amount, said mechanism to perform coupled to said mechanism to determine.

25. A system according to claim 24 wherein said mechanism to determine receives said payload rate and

determines said amount based upon said payload rate and the state of said FIFO in relation to said watermark at the instant said complete MPEG packet arrives in said one-packet buffer.

26. A system according to claim 25 wherein said mechanism to perform arithmetic adds said amount to said timing information.

27. A system according to claim 26 wherein said amount is greater than zero if there are more packets in said FIFO than said watermark at the instant said complete MPEG packet arrives in said one-packet buffer.

28. A system according to claim 26 wherein said amount is less than zero if there are more packets in said FIFO than said watermark at the instant said complete MPEG packet arrives in said one-packet buffer.

29. A system of adapting to a payload rate the effective rate of an MPEG Transport Stream originating with an incoming rate, said Stream having of a sequence of MPEG packets, said system comprising:

a timing information altering mechanism configured to alter timing information in any said packets bearing such information;

a FIFO capable outputting packets at said payload rate, said FIFO characterized by a watermark;

a one-packet buffer accepting said MPEG packets one packet at a time from said Stream;

an instantaneous transfer mechanism coupled between said one-packet buffer and said FIFO, said mechanism forwarding a packet from said one-packet buffer upon a first condition; and

a mechanism to discard a packet in said one-packet buffer based upon a second condition, said discarded packet not forwarded to said FIFO.

30. A system according to claim 29 wherein said incoming rate is more than said payload rate.

31. A system according to claim 30 wherein said first condition includes said FIFO having less packets than said watermark the instant said one-packet buffer contains a complete MPEG packet.

32. A system according to claim 29 wherein said timing information includes a Program Clock Reference value.

33. A system according to claim 31 wherein said second condition includes said FIFO having more packets

than said watermark the instant said one-packet buffer contains a complete MPEG packet, said second condition further including whether said packet can be disposed of.

34. A system according to claim 29 wherein said timing information altering mechanism includes:

a mechanism to test for packets carrying timing information, said mechanism to test coupled to said one-packet buffer;

a mechanism to determine the amount by which said timing information should be altered, said mechanism to determine coupled to said FIFO; and

a mechanism to perform arithmetic on said timing information by said amount, said mechanism to perform coupled to said mechanism to determine.

35. A system according to claim 34 wherein said mechanism to determine receives said payload rate and determines said amount based upon said payload rate and the state of said FIFO in relation to said watermark at the instant said complete MPEG packet arrives in said one-packet buffer.

36. A system according to claim 35 wherein said mechanism to perform arithmetic adds said amount to said timing information.

37. A system according to claim 36 wherein said amount is greater than zero if there are more packets in said FIFO than said watermark at the instant said complete MPEG packet arrives in said one-packet buffer.

38. A system according to claim 36 wherein said amount is less than zero if there are more packets in said FIFO than said watermark at the instant said complete MPEG packet arrives in said one-packet buffer.

39. A system according to claim 33 further comprising:

a mechanism to test whether said packet in said one-packet buffer can be disposed of in support of checking said second condition.